

HIV SERO-DISCORDANCE: PREVALENCE AND PATTERN AT LAUTECH TEACHING HOSPITAL, OSOGBO, SOUTHWEST NIGERIA

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ABSTRACT

Background

Early identification of HIV status as well as necessary interventions, Partners of PLWHA might soon become HIV sero-positives. This will thereby worsen the disease burden.

Objectives

To determine the prevalence and pattern of HIV sero-discordance at LAUTECH Teaching Hospital, Osogbo, Osun state, Nigeria.

Methods

Spouses of HIV reactive patients at Ladoke Akintola University Teaching Hospital (PMTCT & HIV Day care clinic) were counselled and made to undergo voluntary testing for HIV, using Unigold® (Trinity Biotech Plc. Bray, Ireland) and determine® strips (Alere Medical Company Limited, Japan) to screening for HIV antibodies, with stat® pack (Chembio Diagnostic Systems, Inc. USA) as a tie-breaker. Data was analysed with the use of SPSS.

Results

Of the 356 participants, a total of 166 (46.7%) were males. Fifty-four (28.4%) of these females were pregnant. Among the participants, 216 (60.7%) were non-reactive and 140 (39.3%) were HIV reactive with the test strips. Of the non-reactive (HIV sero-discordant) population, proportionately, more were males 110 (50.9%). Amid the reactive population, 84 (60.0%) were females ($p = 0.028$). The gender of respondents ($p = 0.028$), Level of education ($p = 0.035$), unprotected sexual contact ($p = 0.041$), multiple sexual partners ($p = 0.032$), STI ($p = 0.001$), abnormal vaginal discharge ($p = 0.001$), genital ulcer (p value = 0.001) and blood transfusion ($p = 0.001$) have positive association with prevalence of HIV infection in sex partners of PLWHA.

Conclusion

The prevalence of HIV sero-discordance among PLWHA was 60.7% with more of female than male HIV sero-discordance.

KEYWORDS: HIV, HIV Sero-Discordance, PLWHA, Nigeria

INTRODUCTION

HIV infection is currently the fourth leading cause of mortality in the world, with two-third of People Living with HIV/AIDS (PLWHA) located in the sub-Saharan Africa.¹ There is a worldwide HIV prevalence of 33.4 million with annual incidence rate of 2.7million.¹ Nigeria for instance, has HIV prevalence rate of 3.6% with 52% of sero-discordance among couples.^{1,2} In Africa, a large proportion of HIV infections occur within stable relationship either because of prior infection of one partner or because of infidelity.³ A situation where a client tests reactive while the partner is non-reactive is referred to as HIV sero-discordance. The said non- reactive partner may either be uninfected or already infected, but still within the window period of the infection.

The prevalence of HIV sero-discordance differs from place to place depending on their HIV prevalence, cultural believes, religion, level of education, social classes and family planning uptake.⁴ HIV epidemics in sub-Saharan Africa were thought to be men led and a higher prevalence of male sero-discordance will be expected. But literature has it that female HIV sero-discordance ranges between 50-60%.⁴ In sub-Saharan Africa, 66.6% of clients are in HIV sero-discordant relationship.⁴

Epidemiologists have established that HIV infection naturally leads to AIDS in approximately 12 years, irrespective of risk groups, ethnic groups, geographical areas, Major Histocompatibility Complex (MHC) type or HIV diversity. [5] If HIV sero-discordance goes unnoticed, the partners of PLWHA will soon become HIV positive/sero-concordant. This will lead to a higher prevalence of HIV infection, a wider spread especially to their concurrent sexual partners.⁵ When infection progresses to AIDS and eventually leads to death, many orphans and vulnerable children (OVC) result.

Determining the HIV status of partners of HIV infected clients is of great importance. It affords us the opportunities of early detection of infection with improved prognosis of treated cases.⁴ Reassurance and modification of risk behaviours in non-reactive clients can also be ensured.⁴ In addition, it helps in prevention of transmission of HIV in this era of global epidemics of HIV infection and also encourages cost effective use of health care resources.^{2, 4}

The challenges of a heterosexual discordant couple are huge in sub-Saharan Africa and have not received much attention in the literature.^{2, 4} Most studies were carried out in the developed population and are not applicable to our low resource setting.⁴ This is because, despite our large population, only a few of our people are aware of their HIV statuses. Even when known, most will hide it and will not take steps to prevent infection of uninfected partner(s).^{2, 4} The opposite is the case in developed world.

Besides, the peak HIV prevalence occurred in the 21-30 years age groups; who are quite young, sexually active and still within the reproductive age group. [2] Thus, risks of vertical, as well as horizontal transmission. Most clients end up with divorce.^{2, 6} The problem of heterosexual discordant couple is also reflected in the care of HIV sero-positive child in this resource poor setting. In a study conducted at Ile-Ife, Nigeria. It was found that most HIV sero-positive children, whose parents have female sero-discordance end up discharging against medical advice, lost to follow up, not up-to-date in immunization schedule and with higher mortality.⁶ They are mostly taken care of by their mothers alone. The fathers were found to be uninvolved in child's care because of fear of being infected, doubt of child's paternity, as well as a waste of family resources on a dying child.⁶

The aim of this study is to determine the prevalence and pattern of HIV sero-discordance among spouse of PLWHA attending PMTCT and HIV Day care clinic of LTH Osogbo.

MATERIALS AND METHODS

This cross sectional prevalence study was carried out at LTH, Osogbo, Nigeria; which offers comprehensive health care services to PLWHA in Osun state. Eligible clients were people whose sex partner(s) were known HIV/AIDS patients of LTH regardless of their partner's antiretroviral status. For sero-concordant couple, the first HIV client of the two is enrolled, while the sero-negative partner is enrolled for the sero-discordant couples. Exclusion criteria included partners that failed to show up for testing, those that declined to test after counselling, those whose partners were deceased, and partners of HIV clients who failed to inform their sex partners of their HIV status.

Sample Size Determination

Using Fisher's formula,⁷ sample size was calculated to be 310 clients. However, adjusted for anticipated 80% response rate, three hundred and eighty-eight (388) patients were recruited.

Sampling Procedure/Technique

Stratified random sampling of LAUTECH Teaching Hospital HIV clients was done based on gender. Equal number (194) of names of males and females PLWHA were randomly selected from a ballot box during a support group meeting that usually bring all our HIV clients together, and their sex partners were traced, interviewed and tested.

Research Instrument

Data was collected using structured proforma. The proforma included: client's age, sex, pregnancy status (if a female), level of education, religion and occupation. It also included family planning method(s) being used, STI symptoms, consensual sex as well as unprotected sexual exposure to the HIV sero-positive partner. Likewise, partner's duration of HIV infection, CD4 count, ART history and results of client's HIV screening were included. Pregnancy status was confirmed, if indicated, with serum pregnancy test strips.

Data Collection

All clients that met up with above criteria were made to undergo counselling and confidential testing for HIV infection with the parallel use of Unigold® (Trinity Biotech Plc. Bray, Ireland) and determine® strips (Alere Medical Company Limited, Japan) to screening for HIV antibodies, with stat® pack (Chembio Diagnostic Systems, Inc. USA) as a tie-breaker. Universal safety precaution and package insert instructions were ensured when handling specimens and work areas were kept clean and organized. Test procedure entailed labelling each package with patient's identification number. Fifty micro-litre of blood sample was aseptically taken with a pipette into Well "A" of the Unigold®/Stat pack® cassette/determine® strip. Two drops of buffer was applied to the sample pad. A period of 10-20 minutes was allowed before the test result was read. The test was reactive i.e. positive, if there were two distinct red lines in both the "control" and "test" regions. The test was non-reactive i.e. negative, if one red line appears in the "control" region and no line in the "test" region. Post-test counselling was done as soon as feasible and necessary instruction/treatment given.

Data Analysis

Data entry and analysis was done with the use of SPSS version 16. Level of statistical significance was set at

P value ≤ 0.05 .

Ethical Considerations

Ethical clearance was obtained for this study from the ethical committee of LTH, Osogbo.

RESULTS

A total of 388 respondents were enrolled for the study, with equal numbers of males and females. Total valid proforma analyzed was 356 with 166 (46.6%) males and 190 (53.4%) females. The age range of respondent was 19 - 65 years, with a mean of 35.0 ± 9.0 years.

More than half of the respondents had at least secondary level of education. One hundred and forty-six (41.0%) respondents had post-secondary education, 147 (41.3%) stopped at secondary level. Only 36 (10.1%) of the studied population were unemployed. Clients were mostly skilled labour 137 (38.5%) and unskilled labour 127 (35.7%). The remaining 56 (15.7%) were professionals. Likewise, the occupational status of the partners of respondents revealed that 145 (40.7%) were engaged in skilled labor, 135 (37.9%) unskilled labor, 62 (17.4%) professionals and 14 (3.9%) unemployed partners. One hundred and seventy-five (49.2%) of the respondents were Muslims, while the rest 181 (50.8%) were Christians. The details of demographic status of the participants are as shown in Table 1.

Table 2 shows details of identified risk factors for HIV infection. Of the 356 clients, 192 (53.9%) of them had unprotected sexual contact with their known HIV sero-positive partners while 164 (46.1%) did not. Majority, 230 (64.6%) maintained a single sex partner, while 126 (35.4%) had multiple sex partners. Only 86 (24.2%) had current or previous sexually transmitted infections. Similarly, only 28 (7.9%) had or presently have genital ulcer. Positive history of abnormal vaginal discharge was obtained in only 52 (14.6%). Just 47 (13.3%) had pervious history of blood transfusion.

A total of 140 (39.3%) of the 356 participants were reactive. Fifty-four (28.4%) of the female participants were pregnant. Twenty-four (44.4%) of pregnant women tested reactive (sero-concordant with their partner) and 30 (55.6%) tested non-reactive (sero-discordant with their partners). In the non-pregnant group, 76 (55.9%) were non-reactive (sero-discordant) while 60 (44.1%) were reactive (sero-concordant) (Table 3).

The reactive population was made up of 56 (40.0%) males and 84 (60.0%) female while the non-reactive population composed of 110 (50.9%) males and 106 (49.1%) females (table 4). The rapid screening methods also identified 56 (33.7%) of the total male population (166) as being reactive and 110 (66.3%) as being non-reactive while 84 (44.2%) of the female respondents (190) tested reactive and 106 (55.8%) were non-reactive (Table 3).

With cross tabulation of level of education and HIV infection, 50.0% of respondents without any form of education and 53.5% of those with primary level of education were found to be HIV reactive. On the other hand, only about 31.5% of respondents with post-secondary education and 41.5% of those who stopped at secondary school level were found reactive for HIV (p value = 0.035). Table 4 revealed other details of cross tabulation between socio-economic factors and HIV status. The P value obtained for various factors considered are: Gender (p value = 0.028), Pregnancy status (p value = 0.463), Age (p value = 0.386), Educational status (p value = 0.035), Religion (p value = 0.530), Participant's Occupation (p value = 0.395) and Partner's Occupation (p value = 0.193). The result suggests correlation between Gender, Level of education and acquisition of HIV infection.

Likewise, in cross tabulation of HIV status with known predisposing factors listed in the proforma, all except family planning were found to be statistically significant. The P value obtained for these factors are: unprotected sex (p value = 0.041), multiple sex partners (p value = 0.032), STI (p value = 0.001), Abnormal vagina discharge (p value = 0.001), Genital ulcer (p value = 0.001), family planning use (p value = 0.170). Details are as shown in Table 5. Of the 47 participants that had positive history of blood transfusion in the past, 51.1% were found to be reactive to HIV infection (p value = 0.001).

DISCUSSIONS

The prevalence of HIV sero-discordance at LTH, Osogbo, Nigeria was found to be 60.7%. Prevalence of HIV sero-discordance/sero-concordant varies widely in the literature. However, there is general preponderance of more sero-discordance than concordant relationships.^{2,4} This is in keeping with the finding of 60.7% sero-discordance rate in this study. Akanni et al in Port Harcourt Teaching Hospital found 52% sero-discordance² and 66.6% sero-discordance was found in Sub-Saharan Africa⁴ but in Botswana, more of sero-concordant couples were found.⁸

With regards to pattern of HIV sero-discordance, this study has shown that there is a predominance of female HIV sero-discordance. This is similar to findings in Kenya⁸ and some other part of Sub-Saharan Africa.⁴ However, no significant difference in male or female HIV sero-discordance pattern was found in other places like Cameroon⁸ while predominance of male sero-discordance (84%) was the case in another study.⁹ In Cote d'Ivoire, similar to this study, HIV prevalence among females was more than twice as high among males in 2005.¹⁰ The reasons adduced to this higher susceptibility in females are: low literacy level, poor socio-economic classes, socio-cultural believes not in favour of women and also, biologic factor of female reproductive tract being more receptive to HIV.

The ages of respondents in this study ranged between 19 and 65 years with a mean of 35.0 ± 9.0 years. Worthy of mention is the fact that majority, 158 (44.4%) were aged 30 - 39 years. This is the major workforce of the Nation, yet highly susceptible to HIV infection. Thus HIV infection has constituted itself as a major socio-economic hazard worldwide. Rather than being the workforce, when majority in this age group becomes HIV infected without appropriate intervention, they become dependent. HIV is the fourth leading cause of mortality worldwide.¹ with death or depletion of this workforce, more of aged people and children results and these groups contribute very little to the economy of the country. However, the mean age of HIV/AIDS patient at first diagnosis in a study was found to be progressively rising and the life expectancy of HIV infected clients being treated with Highly Active Anti-Retroviral Therapy (HAART) was found to approximate that of the general population matched for age.¹¹

The risk of HIV infection was inversely proportional to respondents' level of education; with lesser proportion of those educated testing reactive to HIV infection (P value = 0.035 for rapid screening methods). Similar studies have shown that there is a lower risk of HIV infection among the more educated people.¹² Religion-wise, 49.2% of the respondents were Muslims while 50.8% were Christians. A study carried out in Brazil (low HIV prevalence area) shows that, members of Pentecostal and Orthodox Churches exhibit reduced risk of HIV infection due in part to their reduced likelihood of having extramarital partners when compared with members of other religious group.¹³

Another study conducted in Africa revealed that due to restriction on sexual behavior, consumption of alcohol and the practice of circumcision, Muslims in Africa may experience reduced level of risk for contracting HIV.¹⁴ These studies are rather based on self-reports which are sometimes of questionable reliability considering the fact that these two religions

are the major ones in Africa, yet home with a high prevalence of HIV infection. However, other studies had suggested that independent of denomination, attendance at religious services/degree of religiosity is associated with reduced odds of both risk behaviors and perceived risk of HIV infection.¹⁵

From table 2, only 53.9% attested to having unprotected sexual intercourse with HIV reactive partners. However, from table 5, it was quite amazing that only 15.7% uses barrier method of family planning. As high as 80.3% do not use any form of family planning despite their high risk of contracting HIV infection. This finding is consistent with what was found out in other similar studies.^{9, 16, 17} With effective counselling, consistent condom use, low STI prevalence and reduced risky behaviour; transmission of HIV infection to the uninfected partner is minimal.^{9, 16, 17} Only one out of the 242 HIV sero-discordant couples studied sero-converted after 12 months of observation.⁹ In addition, another risk factor identified is presence of genital ulcers.²

However, despite above findings, literature has it that a large proportion of sero-discordant couple continued to have unsafe sex.¹⁶ HIV infected women's struggle in primary relationship with sero-discordant partners was brought to lime-light by studies conducted by Buchac et al and Stevens P et al.^{16, 17} Approximately 58% of HIV clients studied were abstinent from sex (self-induced) while as high as 17-35% do have unprotected sex and only approximately 24% uses condom consistently.^{16, 17} Likewise, only 15.7% of the respondents in this study use barrier method of family planning. Worthy of mention is the fact, that HIV infection transmission rate in clients who never used condom is similar to those who use condom inconsistently; under scoring the importance of consistent condom use in preventing HIV infection.^{9, 17} Moreover, 35.4% still engages in having multiple sexual partners despite counselling sessions.

Similar to findings in other studies, this study revealed that high level of education abnormal vaginal discharge, presence of genital ulcer, non usage of condom, and STI were statistically significant in correlation with HIV infection^{2, 4, 9}. Another known risk factor for HIV infection is transfusion of blood and blood products. The parallel between blood safety and HIV cannot be overlooked. Current estimate of HIV transmission approaches 1:2,000,000 units transfused.¹⁸ However, in this study blood transfusion was found statistically significant in association with HIV infection ($p = 0.001$). Safety of blood being transfused should therefore be ensured at all levels of care and whether privately or publicly owned health institutions.

CONCLUSIONS

Our findings indicated the prevalence of HIV sero-discordance was 60.7% among PLWHA with more of female than male HIV sero-discordance. In addition, it had shown that the sex of respondents, level of education, unprotected sexual contact, multiple sexual partners, STI, abnormal vaginal discharge, genital ulcer and blood transfusion have positive impact on acquisition of HIV infection.

Majority of HIV sero-discordant couples engaged in unprotected sexual exposure. Further health promotion on consistent use of barrier methods of contraception is therefore recommended.

CONFLICT OF INTEREST

Authors declares no conflict of interest.

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APPENDICES

Table 1: Socio-Demographic Characteristics of Respondents (n =356)

Variables	Frequency	Percentage
Age (Years)		
Less than 20	2	0.6
20 – 29	104	29.2
30 – 39	158	44.4
40 – 49	68	19.1
50 - 59	14	3.9
60 and above	10	2.8
Educational status		
None	20	5.6
Primary	43	12.1
Secondary	147	41.3
Post-Secondary	146	41.0
Religion		
Islamic	175	49.2
Orthodox Christian	89	25.0
Pentecostal Christian	92	25.8
Partners' Occupation		
Unemployed	14	3.9
Unskilled labour	135	37.9
Skilled labour	145	40.8
Professional	62	17.4

Table 2: Risk Factors for HIV Infection (n =356)

Risk Factors	Frequency (Percentage)		Total
	Yes (%)	No (%)	
Unprotected sex	192 (53.9)	164 (46.1)	356 (100)
Multiple sex partners	126 (35.4)	230 (64.6)	356 (100)
STD	86 (24.2)	270 (75.8)	356 (100)
Genital ulcer	28 (7.9)	328 (92.1)	356 (100)
Abnormal vaginal discharge	54 (14.6)	304 (85.4)	356 (100)
Blood transfusion	47 (13.2)	309 (86.8)	356 (100)

Table 3: Human Immunodeficiency Virus Status of Respondents with the Use of Rapid Screening (n = 356)

HIV Status	Rapid Test Methods (%)		
	Reactive	Non-Reactive	Total
Male respondents	56 (33.7)	110 (66.3)	166 (100)
Female respondents:-	84 (44.2)	106 (55.8)	190 (100)
(a)Pregnant	24 (44.4)	30 (55.6)	54 (100)
(b) Non-Pregnant	60 (44.1)	76 (55.9)	136 (100)
Total	140 (39.3)	216 (60.7)	356 (100)

Table 4: Cross Tabulation of Socio-Economic and HIV Statuses of Respondents Using Rapid Screening Methods (n=356)

Socioeconomic Factors	HIV Status With Rapid Screening Methods (%)			
	Reactive	Non-Reactive	Total	P Value
Sex				
Male	56 (40.0)	110 (50.9)	166 (46.6)	0.028*
Female	84 (60.0)	106 (49.1)	190 (53.4)	
Total	140 (100)	216 (100)	356 (100)	
Pregnancy status				
Pregnant	24(28.6)	30(28.3)	54 (28.4)	0.463
Not pregnant	60 (71.4)	76 (71.7)	136 (71.6)	
Total	84 (100)	106 (100)	190 (100)	

Table 4: Contd.,				
Age group (years)				
Less than 20	—	2 (0.9)	2 (0.6)	0.386
20 – 29	38 (27.1)	66 (30.6)	104 (29.2)	
30 – 39	64 (45.7)	94 (43.5)	158 (44.4)	
40 – 49	28 (20.1)	40 (18.5)	68 (19.1)	
50 – 59	8 (5.7)	6 (2.8)	14 (3.8)	
≥ 60	2 (1.4)	8 (3.7)	10 (2.9)	
Total	140 (100)	216 (100)	356 (100)	
Level of education				
None	10 (7.1)	10 (4.6)	20 (5.6)	0.035*
Primary	23 (16.4)	21 (9.3)	43 (12.1)	
Secondary	61 (43.6)	86 (39.8)	147 (41.3)	
Post-Secondary	47 (32.9)	100 (46.3)	146 (41.0)	
Total	140 (100)	216 (100)	356 (100)	
Religion				
Islamic	63 (44.1)	112 (51.0)	175 (49.2)	0.530
Orthodox	37 (26.5)	52 (24.5)	89 (25.0)	
Pentecostal	40 (29.4)	52 (24.5)	92 (25.8)	
Total	140 (100)	216 (100)	356 (100)	
Respondent's occupation				
Unemployed	10 (7.1)	26 (12.2)	36 (10.1)	0.395
Unskilled	52 (37.2)	75 (34.6)	127 (35.7)	
Skilled	58 (41.4)	79 (36.4)	137 (38.5)	
Professional	20 (14.3)	36 (16.8)	56 (15.7)	
Total	140 (100)	216 (100)	356 (100)	
Partner's occupation				
Unemployed	4 (2.9)	10 (4.6)	14 (3.9)	0.193
Unskilled	45 (32.1)	90 (41.7)	135 (37.9)	
Skilled	65 (46.4)	80 (37.0)	145 (40.8)	
Professional	26 (18.6)	36 (16.7)	62 (17.4)	
Total	140 (100)	216 (100)	356 (100)	

* Statistically significant

Table 5: Cross Tabulation of Predisposing Factors and HIV Status Using Rapid Screening Methods (n=356)

Risk Factors	HIV Status with Rapid Screening Methods (%)			
	Reactive	Non-Reactive	Total	P Value
Unprotected sexual contact				
Yes	84 (60.0)	108 (50.0)	192 (53.9)	0.041*
No	56 (40.0)	108 (50.0)	164 (46.1)	
Total	140 (100)	216 (100)	356 (100)	
Multiple sexual partner				
Yes	52 (37.1)	74 (34.3)	126 (35.4)	0.032*
No	88 (62.9)	142 (65.7)	230 (64.6)	
Total	140 (100)	216 (100)	356 (100)	
STI				
Yes	48 (34.3)	38 (17.6)	86 (24.2)	0.001*
No	92 (65.7)	178 (82.4)	270 (75.8)	
Total	140 (100)	216 (100)	356 (100)	
Abnormal vaginal discharge				
Yes	40 (28.6)	12 (5.6)	52 (14.6)	0.001*
No	100 (71.4)	204 (94.4)	304 (85.4)	
Total	140 (100)	216 (100)	356 (100)	

Table 5: Contd.,				
Genital ulcer				
Yes	24 (17.1)	4 (1.9)	28 (7.9)	0.001*
No	116 (82.9)	212 (98.1)	328 (92.1)	
Total	140 (100)	216 (100)	356 (100)	
Blood transfusion				
Yes	32 (22.9)	15 (6.9)	47 (13.2)	0.001*
No	108 (77.1)	201 (93.1)	309 (86.8)	
Total	140 (100)	216 (100)	356 (100)	
Family planning				
None	120 (85.7)	166 (76.8)	386 (80.3)	0.170
Barrier	16 (11.5)	40 (18.5)	56 (15.8)	
Hormonal contraceptives	—	4 (1.9)	4 (1.1)	
IUCD	2 (1.4)	4 (1.9)	8 (1.7)	
Abstinence	2(1.4)	2 (0.9)	4 (1.1)	
Total	140 (100)	216 (100)	356 (100)	

* Statistically significant